MARYLAND
DEPARTMENT OF
NATURAL RESOURCES

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April 5, 2010

Memorandum

To: John Grace, Maryland Department of the Environment
Jason Zhao, Maryland Department of the Environment

From: Don Cosden, Assistant Director, Fisheries Service

Subject: Proposed Increases in Water Appropriation from the Savage River Reservoir and Coldwater Fisheries Resources

The Maryland Department of Natural Resources, Fisheries Service (MDNR-FS) has considered the request from the town of Westernport for increased water appropriation from the Savage River Reservoir. The following comments and concerns have been prepared in coordination with MDNR Environmental Review Unit.

The Savage River tailwater is well known as one of the best wild trout rivers in the Mid-Atlantic area. The quality of this fishery along with excellent public access and location within the Savage River State Forest has made this a prime destination for local and visiting anglers. This fishery contributes a significant amount of revenue to local and state economies and adds immeasurably to the quality of life of local residents.

The development of this fishery is the result of MDNR-FS management strategy of Special Trophy Fishing Regulations and a no stocking policy. More importantly the stable coldwater habitat which the fishery depends on exists due to minimum flows from the reservoir which were established in the early 80s by the Savage River Instream Flow Committee. These flows maintain stable cold temperatures during critical months of June, July, August and September.

The bottom release design of the dam maintains cold water temperatures below the dam. However, annual cold water volume is finite. It is not replenished after upstream inflow warms (usually mid-May) but is gradually depleted during the months of June through September. Dedicated operational obligations specific to dam function, municipal water supply obligations and ancillary support of recreational opportunities all act to deplete cold water reserves. Striking a balance for all users is our objective and that will require careful monitoring and calculated usage of the cold water resource.

Maintaining cold water is key to protecting the coldwater community and quality fishery which exists below the Savage River Dam. Results from a report contracted by DNR state this need succinctly. *"MDNR-FS would like to maintain river temperature at or below 68 °F from the dam downstream to the Potomac River to sustain a coldwater fishery during the summer period from June through September. Since there is the potential for warming of river water as water moves downstream from the dam, the release temperature should be no warmer than about 60 °F to allow for heating during low-flow, warm summer conditions while maintaining suitable coldwater fishery habitat conditions in the river"* (Schreiner, 2010)**.** This report was based on modeling of annual coldwater usage for the years of available data. It points out that during some years the supply of cold water has been nearly exhausted before the end of the summer period under the current water usage (Westernport withdrawal of .75 mgd and an average minimum flow of 55 cfs) practices. The analysis was based on the original request of an additional 2.75 mgd, however any additional appropriation increases the risk of premature loss of coldwater and consequently the inability to maintain desired temperature and minimum flows during very dry years. It should be noted that excessively wet summer conditions can also reduce the cold water storage due to the need to increase releases to compensate for high temperature inflow and spillover conditions.

The referenced increase in water temperature between the dam and the mouth of the river during the summer is not well quantified but this is a recognized phenomenon that requires additional study. A large variation in water temperature was noted during a fish population survey conducted by MDNR-FS in August of 2009. On that day the discharge was temporarily reduced to 30 cfs to accommodate survey activities. Although discharge at the dam was less than 55 °F, water temperatures at the mouth were observed at 66 °F. Had the discharge at the dam been 60 °F then water near the mouth of the river may have exceeded the 68 °F threshold.

In addition to temperature, minimum flow is critical to the health of this coldwater resource. Generally a reduction in volume reduces the total aquatic habitat and therefore reduces the biomass of all coldwater organisms including trout. However the relationship is not linear. A physical habitat simulation which modeled the relationship between discharge and suitable brown trout habitat in the Savage River tailwater indicated that suitable habitat increases greatly between 10 and 60 cfs (Schreiner and Weisberg, 1990). A more gradual increase occurs up to 100 cfs above which habitat gains level off. A similar analysis indicated substantial increases for brook trout occurred up to 90 cfs (Friday and Kazyak, 1992). Combined results of these studies point to an ideal minimum discharge around 90 cfs to maximize the trout fishery however during some years this would lead to the depletion of coldwater within the critical summer period. As a result standard operating procedure has been to maintain a minimum of 55 cfs which is reduced if discharge threatens to exhaust coldwater storage before the end of September. Considering that the resource is already limited by the availability of coldwater, MDNR would generally oppose any further loss of instream flow that isn't essential to the health and well being of the citizens of Maryland and neighboring states within the watershed.

If increased municipal withdrawals are approved, MDNR requests that coldwater storage in the reservoir be periodically evaluated during the June to September period. Once the volume of water at 60 °F or less is no longer adequate to maintain 55 cfs through September 30 at the increased withdrawal rate a management action should be triggered to reduce withdrawal to the minimum necessary for the town of Westernport. This volume can be easily estimated and verified from the bi-weekly temperature profile data because coldwater is not replenished through the summer period. Coldwater reserves should also be immediately re-estimated following any major increases in discharge such as white water release events or releases to compensate for warm water cresting the spillway.

MDNR also recommends that a minimum flow of 55 cfs be the year round target. This strategy will maximize suitable trout spawning habitats in the fall, minimize anchor ice formation in the winter, and minimize dewatering and exposure of trout eggs and developing fry to icing conditions during the winter months.

Finally increased water withdrawals may pose a risk during mid-April to late May period after an exceptionally dry winter. If snowpack and groundwater are inadequate there is a risk that the minimum flow wont be met as the reservoir is being brought up to full pool. A delay in filling the reservoir may provide inadequate coldwater volume to cover the summer period. As a result reduced withdrawals may be occasionally be necessary during this period to maintain minimum flows and bring the reservoir to full pool by late May.

Literature Cited

Friday, M.A., and P.F. Kazyak, 1992. Development of Habitat Suitability Criteria and IFIM Analysis for Brook Trout in the Savage River. Report prepared for Maryland Department of Natural Resources, Freshwater Fisheries Division. Available upon Request.

Schreiner, S.P., Savage Reservoir Temperature Model. Report prepared for Maryland Department of Natural Resources, Fisheries Service. Available upon Request.

Schreiner, S.P., and S.B. Weisberg, 1990. Physical Habitat Simulation for Brown Trout in the Savage River. Report prepared for Maryland Department of Natural Resources, Tidewater Administration. Available upon Request.

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